

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(SUPPLEMENTARY SHEET)

International file No. PCT/EP2005/050177

The following document is cited in this notice:

D1: Martin Sundin, Path and Articulation Regulating Algorithms for the "Modular Robot." Thesis, Institute for Automatics, ETH Zurich, 1993.

1. The present Claim 1 does not meet the requirements of Article 33(2) PCT because its subject matter is not novel.

D1 describes a method for generating a model for the functional response of a control device (see Figure 4.1.1, computer) where the control device is designed for calculating a suitable manipulated variable (TS) $[\tau_s]$ for a downstream controlled system (see Figure 4.1.1, dynamic system) in response to a preselected setpoint value (p_s , equation 4.3.1) for at least one controlled variable (TS) $[\tau_s]$ of the controlled system (dynamic system); comprising the steps:

- preselecting a model (equations 3.2.3 and 3.2.4) representing the functional response of the controlled system (dynamic system) with the help of state variables (x_i $[x_i]$),

whereby (Claim 3) the model of the controlled system (dynamic system) maps the functional response of the controlled system with the help of model equations only inasmuch as this is relevant for the response for a control and/or regulation of the controlled variable (equation 3.2.1); and

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whereby one of the state variables (x_i [x_i] where $i =$
1) represents the controlled variable ($p_1 = p_2$) (see
Figure 4.3.2); and

- generating the model for the control device (Figure
4.1.1, computer) by inverting the model for the
controlled system (equation 4.3.3);

whereby the inversion comprises the following steps:

- calculating an equation for the second derivation
for the controlled variable (equation 4.3.2) as a
function of the controlled variable itself (equation
4.3.1)

- generating the model for the control device
(equation 4.3.2 inserted into equation 4.3.3).

The present Claim 6 defines a device corresponding to the
method defined in Claim 1. Therefore, Claim 6 also fails
to meet the requirements with regard to novelty and
inventive step for the reasons explained above.

2. Claims 2, 4, 5 and 7 also appear not to contain any other
features which could eliminate the above objection of
lack of inventive step:

Claim 2: It is apparent from the arguments above that
those skilled in the art would perform complete
calculations for the inverse of the dynamic system to be
able to implement an optimum "feed forward." If there
were an analytical solution to the inverse equation,
those skilled in the art would perform the steps in Claim
2.

Claim 7: see Figure 4.1.1.

Re Point

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The invention relates to a controlled system of an air path system of an internal combustion engine, an injection system, an engine speed regulation, or a torque regulation having the features of independent Claim 1.

1. Most proximate related art

Document D1 (WO 89/09953) discloses a method for tracking the trajectory of axial positions of a robot. In this method, it is assumed that the controlled system is linear and may be described with the help of a transfer function $G(s)$ in the frequency range. A manipulated variable for the controlled system is determined from the trajectory sequence, i.e., the predetermined setpoint characteristic of the axial motion, with the help of a control device whose transfer function corresponds to the inverse of the transfer function of the controlled system. To be able to set the controlled variable even more precisely to the preselected setpoint characteristic, the manipulated variable is corrected, if necessary, with the help of a regulating device connected in parallel with the control device.

2. Particular feature(s)

The features of the characterizing portion of Claim 1.

3. Technical object achieved

The method disclosed in D1 has the disadvantage that it is applicable only to controlled systems having a linear response and having only one controlled variable. These disadvantages are avoided by the particular features.

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This approach is neither known from nor suggested by the present related art and therefore is based on an inventive step.

4. Claims 2 through 4 depend on Claim 1 and consequently their subject matter is also novel and based on an inventive step.

5. If the present patent application is pursued further, the description would have to be adapted to the revised claims (Rule 5.1 (a) (iii) PCT).\

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